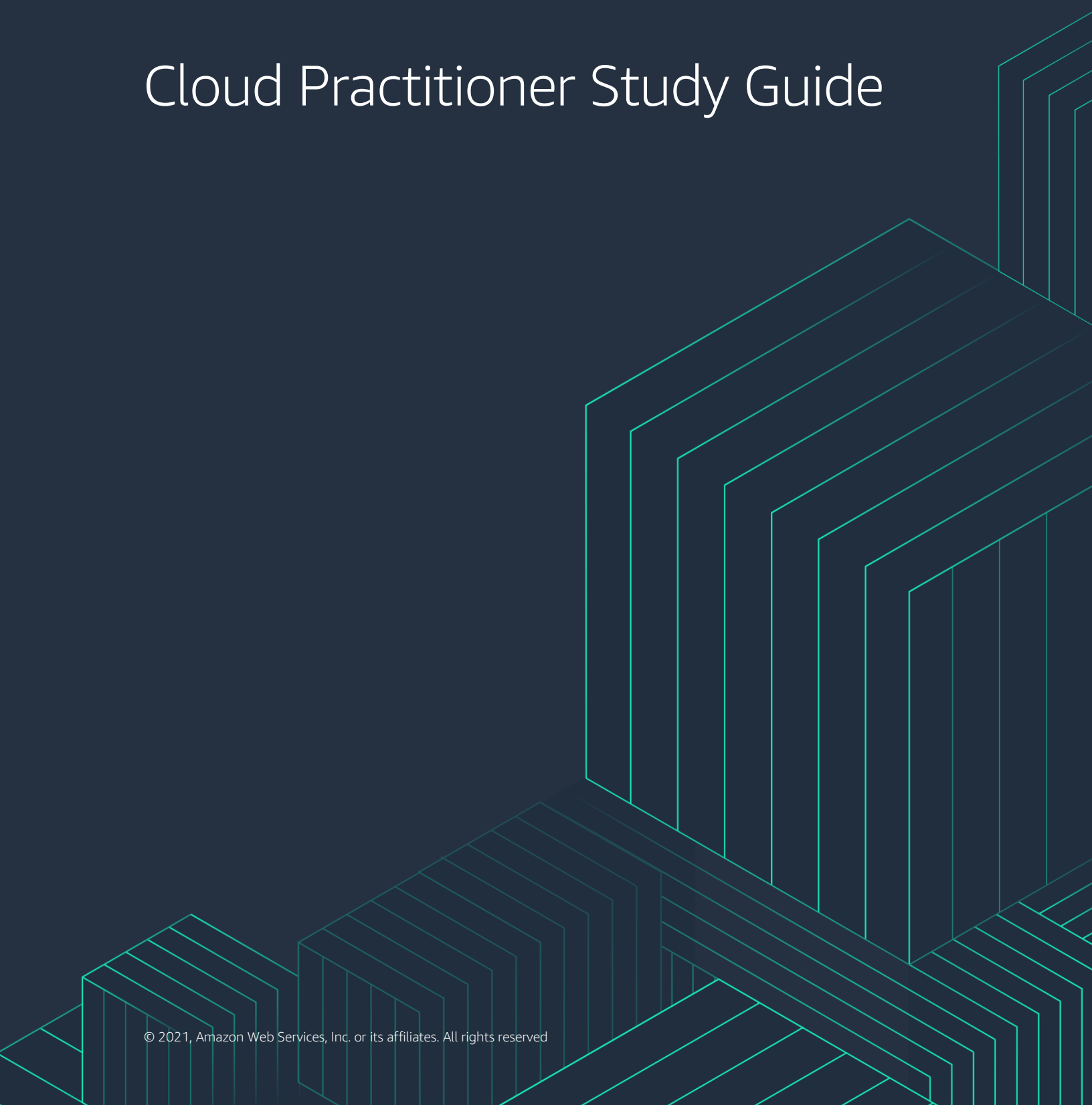
aws training and certification

Cloud Practitioner Study Guide



Cloud Pracitioner Certification

The Fundamental AWS Cloud Certification

Purpose of this guide:

This document is meant to serve as a guide for you in your review of AWS concepts and services. It is designed to highlight as much of the information you will need to prepare for the exam. If you are reading this you should have completed one or more AWS Partner Accreditations and have completed the Cloud Practitioner Essentials training available either digitally or delivered by an AWS Partner Trainer.

Exam Guide

The AWS Certified Cloud Practitioner examination is intended for individuals who have the knowledge and skills necessary to effectively demonstrate an overall understanding of the AWS Cloud, independent of specific technical roles addressed by other AWS Certifications. The exam can be taken at a testing center or from the comfort and convenience of a home or office location as an online proctored exam. As you complete your studies, focus on understanding why a service should be applied to a specific problem and the business value that it brings. This type of situation-to-service recognition skill is what is primarily being tested during the exam.

Becoming an AWS Certified Cloud Practitioner is a highly recommended, optional, step toward achieving an Associate-level or Specialty-level certification. The exam validates that you have the following skills and knowledge:

- Understand and articulate the value of the AWS Cloud
- Understand and explain the AWS Shared Responsibility Model – Security of the cloud vs. Security in the cloud
- Understand and articulate fundamental security best practices
- Understand the basics of AWS Cloud costs, economics, and billing practices
- Describe and position the core AWS services, including compute, networking, and storage
- Identify AWS services for common use cases
- Define the AWS Cloud and the basics of its global infrastructure
- Describe the AWS Cloud value proposition
- Describe basic/core characteristics of deploying and operating in the AWS Cloud

Recommended Whitepapers and Reading:

1. AWS Global Infrastructure
2. AWS Support Plans
3. AWS Well-Architected Framework
4. Shared Responsibility Model
5. How AWS Pricing Works
6. Sample Questions

Recommended Quiz Shows

1. Quiz Show 1
2. Quiz Show 2
3. Quiz Show 3
4. Quiz Show 4

Domain: Cloud Concepts

The Cloud Concepts domain focuses on the value proposition of the AWS Cloud and how AWS can provide immediate business value to customers. The questions are focused on the business-oriented benefits that come from using the correct AWS services and solutions. This section accounts for 26% of the exam (~17 Questions).

1. **Define the AWS Cloud and its value proposition**
    a. Cloud computing is the on-demand delivery of IT resources over the internet with pay-as-you-go pricing. These include services that provide compute power, object and file storage, networking capabilities, and more.
    b. A shift to pay-as-you-go pricing allows the reallocation of resources to revenue-generating activities as opposed to managing on-premise infrastructure.
2. **Identify aspects of AWS Cloud Economics**
    a. Understand the concept of Total Cost of Ownership (TCO)
    b. Understand the role of Operational Expenses (OpEx)
    c. Understand the role of Capital Expenses (CapEx)
    d. Identify the operations that could reduce costs by moving to the cloud
    e. Stop guessing capacity
    f. Increase speed and agility
    g. Improve security
    h. Go global in minutes
3. **List the different cloud architecture design principles (refer to the Well-Architected Framework Whitepaper)**
    a. Scaling
    b. Availability
    c. Automation
    d. Monitoring
    e. Security

AWS Well-Architected Framework

A new addition in 2022 iterations of the exam, the AWS Well-Architected Framework helps cloud architects build secure, high-performing, resilient, and efficient infrastructure for a variety of applications and workloads. Built around six pillars—operational excellence, security, reliability, performance efficiency, cost optimization, and sustainability—AWS Well-Architected provides a consistent approach for customers and partners to evaluate architectures and implement scalable designs.

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The Fundamental AWS Cloud Certification

For the purposes of the Cloud Practitioner exam, be familiar with each of the six pillars and the general concepts within them. What follows is a brief summary of each of the pillars:

1. **Operational Excellence Pillar:**
    a. The operational excellence pillar focuses on running and monitoring systems, and continually improving processes and procedures. Key topics include automating changes, responding to events, and defining standards to manage daily operations.
        i. Understanding what skills/tasks are associated with the Operational Excellence Pillar is more than enough for this exam. To read more, review this pillar.
2. **Security Pillar:**
    a. The security pillar focuses on protecting information and systems. Key topics include confidentiality and integrity of data, managing user permissions, and establishing controls to detect security events.
        i. Understanding what skills/tasks are associated with the Security Pillar is more than enough for this exam. To read more, review this pillar.
3. **Reliability Pillar:**
    a. The reliability pillar focuses on workloads performing their intended functions and how to recover quickly from failure to meet demands. Key topics include distributed system design, recovery planning, and adapting to changing requirements.
        i. Understanding what skills/tasks are associated with the Reliability Pillar is more than enough for this exam. To read more, review this pillar.
4. **Performance Efficiency Pillar:**
    a. The performance efficiency pillar focuses on structured and streamlined allocation of IT and computing resources. Key topics include selecting resource types and sizes optimized for workload requirements, monitoring performance, and maintaining efficiency as business needs evolve.
        i. Understanding what skills/tasks are associated with the Performance Efficiency Pillar is more than enough for this exam. To read more, review this pillar.
5. **Cost Optimization Pillar:**
    a. The cost optimization pillar focuses on avoiding unnecessary costs. Key topics include understanding spending over time and controlling fund allocation, selecting resources of the right type and quantity, and scaling to meet business needs without overspending.
        i. Understanding what skills/tasks are associated with the Cost Optimization Pillar is more than enough for this exam. To read more, review this pillar.
6. **Sustainability Pillar:**
    a. The sustainability pillar focuses on minimizing the environmental impacts of running cloud workloads. Key topics include a shared responsibility model for sustainability, understanding impact, and maximizing utilization to minimize required resources and reduce downstream impacts.
        i. Understanding what skills/tasks are associated with the Cost Optimization Pillar is more than enough for this exam. To read more, review this pillar.

Domain: Security and Compliance

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The Fundamental AWS Cloud Certification

The Security and Compliance domain is focused on the core security concepts and fundamental best practices in AWS. The domain does not require technical or configuration-based knowledge, instead, it focuses on your understanding of the AWS security principles, services, and support models. The Security and Compliance domain accounts for 25% of the exam (~16 Questions).

Define the AWS Shared Responsibility Model

1. AWS is responsible for the OF the cloud (datacenters, physical security, hardware networking, etc.)
2. Customer is responsible for everything that goes IN the cloud (data, encryption, IAM, software, etc.)
3. It is crucially important to understand which components and parts of AWS are your responsibility for each service. For example, with EC2 you maintain control over the OS, whereas with RDS, AWS is responsible for the OS. The Shared Responsibility model will show up heavily on the exam. Additional details are available on the AWS website in form of various documentation.

Define AWS Cloud security and compliance concepts

1. Concept of least-privilege-access means everyone has the least amount of access needed to perform their roles. Use the IAM service to set up permissions.
2. Always protect external facing resources such as S3 buckets.
3. Use encryption at-rest and in-transit.

Identify AWS access management capabilities

1. IAM – Identity and Access Management gives you the ability to define permissions for access for users, groups or roles.
2. Can be used in conjunction with on-premises services like Active Directory or cloud-hosted active-directory

Identify resources for Security Support

a. **AWS CloudTrail** – AWS CloudTrail is a service that enables governance, compliance, operational auditing, and risk auditing of your AWS account.
b. **AWS Config** – AWS Config is a service that enables you to assess, audit, and evaluate the configurations of your AWS resources.
c. **AWS Artifact** - AWS Artifact is your go-to, central resource for compliance-related information that matters to you. It provides on-demand access to AWS' security and compliance reports and select online agreements. Inspector - Amazon Inspector is an automated security assessment service that helps improve the security and compliance of applications deployed on AWS.
d. **Amazon GuardDuty** – Amazon GuardDuty is a threat detection service that continuously monitors for malicious activity and unauthorized behavior to protect your AWS accounts, workloads, and data stored in Amazon S3.
e. **AWS Shield** - AWS Shield is a managed Distributed Denial of Service (DDoS) protection service that safeguards applications running on AWS. AWS Shield provides always-on detection and automatic inline mitigations that minimize application downtime and

latency, so there is no need to engage AWS Support to benefit from DDoS protection.

f. **Amazon Macie** - Amazon Macie is a fully managed data security and data privacy service that uses machine learning and pattern matching to discover and protect your sensitive data in AWS.
g. **AWS Security Hub** - AWS Security Hub gives you a comprehensive view of your security alerts and security posture across your AWS accounts. There are a range of powerful security tools at your disposal, from firewalls and endpoint protection to vulnerability and compliance scanners.
h. **AWS Trusted Advisor** - AWS Trusted Advisors provides recommendations that help you follow AWS best practices. Trusted Advisor evaluates your account by using checks. These checks identify ways to optimize your AWS infrastructure, improve security and performance, reduce costs, and monitor service quotas. You can then follow the check recommendations to optimize your services and resources. (Remember that this includes security checks!)

Domain: Technology

The Technology domain covers the core architecture and services that make up the AWS cloud. This section requires baseline knowledge of many AWS services and capabilities. This section is the largest and accounts for 33% of the exam (~21 Questions).

1. **Define methods of deploying and operating in the AWS Cloud**
    a. **AWS Management Console** - The AWS Management Console gives you secure login using your AWS or IAM account credentials.
    b. **AWS CLI** - The AWS Command Line Interface (CLI) is a unified tool to manage your AWS services. With just one tool to download and configure, you can control multiple AWS services from the command line and automate them through scripts.
    c. **AWS SDK** – The AWS Software Development Kit (SDK) allows you to access AWS services using most development languages as part of an application.
    d. **AWS CloudFormation** - AWS CloudFormation provides a common language for you to model and provision AWS and third-party application resources in your cloud environment. AWS CloudFormation allows you to use programming languages or a simple text file to model and provision, in an automated and secure manner, all the resources needed for your applications across all regions and accounts. CloudFormation has no cost, but you pay for the cost of services and resources provisioned.
2. **Define the AWS global infrastructure**
    a. **Region** - Each Amazon EC2 Region is designed to be isolated from the other Amazon EC2 Regions. This achieves the greatest possible fault tolerance and stability. Regions are aligned to geographic regions
    b. **Availability Zone (AZ)** - Availability Zones are multiple, isolated locations within each Region.

c. **Edge Location** - A site that CloudFront uses to cache copies of your content for faster delivery to users at any location. Part of the AWS Content Delivery Network (CDN)
d. **Route 53** - Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like www.example.com into the numeric IP addresses like 192.0.2.1 that computers use to connect to each other.

3. **Identify the core AWS services**
    a. **Compute** – Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment.
        i. **Amazon EC2** –
            1. **Autoscaling** – AWS Auto Scaling monitors your applications and automatically adjusts capacity to maintain steady, predictable performance at the lowest possible cost. Using AWS Auto Scaling, it's easy to setup application scaling for multiple resources across multiple services in minutes. The service provides a simple, powerful user interface that lets you build scaling plans for resources including Amazon EC2 instances and Spot Fleets, Amazon ECS tasks, Amazon DynamoDB tables and indexes, and Amazon Aurora Replicas.
            2. **AMI** - An Amazon Machine Image (AMI) provides the information required to launch an instance. You must specify an AMI when you launch an instance.
        ii. **AWS Elastic Beanstalk** - AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS. You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring.
        iii. **Amazon ECS** - Amazon Elastic Container Service (Amazon ECS) is a fully managed container orchestration service. Customers such as Duolingo, Samsung, GE, and Cookpad use ECS to run their most sensitive and mission critical applications because of its security, reliability, and scalability.
        iv. **Amazon EKS** - Amazon Elastic Kubernetes Service (Amazon EKS) is a fully managed Kubernetes service. Customers such as Intel, Snap, Intuit, GoDaddy, and Autodesk trust EKS to run their most sensitive and mission critical applications because of its security, reliability, and scalability.
        v. **AWS Lambda** - AWS Lambda lets you run code without provisioning or managing servers. You pay only for the compute time you consume. (Serverless)
    b. **Storage** –
        i. **Amazon S3 -** Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. This means customers of all sizes and industries can use it to

store and protect any amount of data for a range of use cases, such as websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics. Amazon S3 provides easy-to-use management features so you can organize your data and configure finely-tuned access controls to meet your specific business, organizational, and compliance requirements. Amazon S3 is designed for 99.999999999% (11 9's) of durability, and stores data for millions of applications for companies all around the world.

ii. **Glacier -** Amazon S3 Glacier and S3 Glacier Deep Archive are a secure, durable, and extremely low-cost Amazon S3 cloud storage classes for data archiving and long-term backup. They are designed to deliver 99.999999999% durability, and provide comprehensive security and compliance capabilities that can help meet even the most stringent regulatory requirements.

iii. **Amazon EBS -** Amazon Elastic Block Store (EBS) is an easy to use, high performance block storage service designed for use with Amazon Elastic Compute Cloud (EC2) for both throughput and transaction intensive workloads at any scale. A broad range of workloads, such as relational and non-relational databases, enterprise applications, containerized applications, big data analytics engines, file systems, and media workflows are widely deployed on Amazon EBS.

iv. **Amazon EFS -** Amazon Elastic File System (Amazon EFS) provides a simple, scalable, fully managed elastic NFS file system for use with AWS Cloud services and on-premises resources. It is built to scale on demand to petabytes without disrupting applications, growing and shrinking automatically as you add and remove files, eliminating the need to provision and manage capacity to accommodate growth.

v. **AWS Storage Gateway -** AWS Storage Gateway is a hybrid cloud storage service that gives you on-premises access to virtually unlimited cloud storage. Customers use Storage Gateway to simplify storage management and reduce costs for key hybrid cloud storage use cases. These include moving backups to the cloud, using on-premises file shares backed by cloud storage, and providing low latency access to data in AWS for on-premises applications.

c. **Database** –

i. **Amazon RDS** - Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups. It frees you to focus on your applications so you can give them the fast performance, high availability, security and compatibility they need. (SQL database)

ii. **Amazon DynamoDB** - Amazon DynamoDB is a key-value and document database that delivers single-digit millisecond performance at any scale. It's a fully managed, multiregion, multimaster, durable database with built-in security, backup and restore, and in-memory caching for internet-scale applications. DynamoDB can handle more than 10 trillion requests per day and can support peaks of more than 20 million requests per second. (NoSQL database)

iii. **Amazon Aurora** - Amazon Aurora is a MySQL and PostgreSQL-compatible relational database built for the cloud that combines the performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open-source databases.
iv. **Amazon Neptune** - Amazon Neptune is a fast, reliable, fully managed graph database service that makes it easy to build and run applications that work with highly connected datasets. The core of Amazon Neptune is a purpose-built, high-performance graph database engine optimized for storing billions of relationships and querying the graph with milliseconds latency.
v. **Amazon ElastiCache** - Amazon ElastiCache allows you to seamlessly set up, run, and scale popular open-Source compatible in-memory data stores in the cloud. Build data-intensive apps or boost the performance of your existing databases by retrieving data from high throughput and low latency in-memory data stores. (Redis and Memcached)

d. **Networking** –
i. **Amazon VPC -** Amazon Virtual Private Cloud (Amazon VPC) lets you provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define. You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.
ii. **AWS VPN -** AWS Virtual Private Network solutions establish secure connections between your on-premises networks, remote offices, client devices, and the AWS global network.
iii. **AWS Direct Connect -** AWS Direct Connect is a cloud service solution that makes it easy to establish a dedicated network connection from your premises to AWS. Using AWS Direct Connect, you can establish private connectivity between AWS and your datacenter, office, or colocation environment, which in many cases can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections.
iv. **ELB -** Elastic Load Balancing automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances, containers, IP addresses, and Lambda functions. It can handle the varying load of your application traffic in a single Availability Zone or across multiple Availability Zones.
v. **Security Group -** A *security group* acts as a virtual firewall for your instance to control inbound and outbound traffic. When you launch an instance in a VPC, you can assign up to five security groups to the instance. Security groups act at the instance level, not the subnet level.
vi. **NACL -** A *network access control list (ACL)* is an optional layer of security for your VPC that acts as a firewall for controlling traffic in and out of one or more subnets. You might set up network ACLs with rules similar to your security groups in order to add an additional layer of security to your VPC

e. **Migration** –
i. **Database Migration Service –** AWS Database Migration Service helps you migrate databases to AWS quickly and securely. The source database remains

fully operational during the migration, minimizing downtime to applications that rely on the database.

ii. **Server Migration Service -** AWS Server Migration Service (SMS) is an agentless service which makes it easier and faster for you to migrate thousands of on-premises workloads to AWS. AWS SMS allows you to automate, schedule, and track incremental replications of live server volumes, making it easier for you to coordinate large-scale server migrations.

f. **Management Tools** –

i. **AWS CloudTrail -** AWS CloudTrail is a service that enables governance, compliance, operational auditing, and risk auditing of your AWS account. With CloudTrail, you can log, continuously monitor, and retain account activity related to actions across your AWS infrastructure. CloudTrail provides event history of your AWS account activity, including actions taken through the AWS Management Console, AWS SDKs, command line tools, and other AWS services.

ii. **Amazon CloudWatch -** Amazon CloudWatch is a monitoring and observability service built for DevOps engineers, developers, site reliability engineers (SREs), and IT managers. CloudWatch provides you with data and actionable insights to monitor your applications, respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health. CloudWatch collects monitoring and operational data in the form of logs, metrics, and events, providing you with a unified view of AWS resources, applications, and services that run on AWS and on-premises servers. You can use CloudWatch to detect anomalous behavior in your environments, set alarms, visualize logs and metrics side by side, take automated actions, troubleshoot issues, and discover insights to keep your applications running smoothly.

iii. **AWS Trusted Advisor -** AWS Trusted Advisor is an online tool that provides you real time guidance to help you provision your resources following AWS best practices. Trusted Advisor checks help optimize your AWS infrastructure, increase security and performance, reduce your overall costs, and monitor service limits. Whether establishing new workflows, developing applications, or as part of ongoing improvement, take advantage of the recommendations provided by Trusted Advisor on a regular basis to help keep your solutions provisioned optimally.

iv. **AWS Systems Manager –** AWS Systems Manager gives you visibility and control of your infrastructure on AWS. Systems Manager provides a unified user interface so you can view operational data from multiple AWS services and allows you to automate operational tasks across your AWS resources. With Systems Manager, you can group resources, like Amazon EC2 instances, Amazon S3 buckets, or Amazon RDS instances, by application, view operational data for monitoring and troubleshooting, and take action on your groups of resources.

4. **Identify the resources for technology support**

a. **AWS Support Models** - Review the content in the link in the Whitepapers and Reading section for full details and be familiar with the SLA's.

i. **Basic** - AWS Basic Support offers all AWS customers access to our Resource Center, Service Health Dashboard, Product FAQs, Discussion Forums, and

Support for Health Checks – at no additional charge. Customers who desire a deeper level of support can subscribe to AWS Support at the Developer, Business, or Enterprise level.

ii. **Developer** – 24 hours or less for General Guidance and 12 hours or less for System Impaired. Does not include phone support.
iii. **Business** – Includes phone support. Enhanced SLA's.
iv. **Enterprise -** Highest and most expensive level of support. Includes a Technical Account Manager (TAM) and an SLA of under 15 minutes for critical events. Includes phone support.

Domain: Billing and Pricing

Billing and Pricing is about understanding the different tools, pricing models (not prices) and services that can be used to help you define and understand AWS charges. This section contains accounts for 16% of the exam (~10 Questions).

Compare and contrast the various pricing models for AWS

1. **S3 Pricing** – Understand how the different pricing models for S3 provide varying levels of access, durability and retrieval times
    a. **Storage:** You pay for storing objects in your S3 buckets. The rate you're charged depends on your objects' size, how long you stored the objects during the month, and the storage class. These classes are listed below from most to least expensive. Actual cost per TB and request are not necessary for Cloud Practitioner, but you will need to understand which storage class offers the best solution for a given scenario:
        i. **S3 Standard:** Offers high durability, availability, and performance object storage for frequently accessed data.
        ii. **S3 Intelligent-Tiering:** Automatically moves objects between the storage classes based on access patterns to maximize cost savings. While there is a small monthly fee for this service, the cost savings it generates will outweigh this fee.
        iii. **S3 Standard - Infrequent Access:** For data that is accessed less frequently, but requires rapid access when needed.
        iv. **S3 One Zone - Infrequent Access:** Unlike other S3 Storage Classes which store data in a minimum of three Availability Zones (AZs), S3 One Zone-IA stores data in a single AZ and costs 20% less than S3 Standard-IA.
        v. **S3 Glacier** - For data that needs the "11 9's" of durability but does not require immediate access. Expedited retrieval times of 1-5 minutes and standard retrieval time of 3-5 hours.

vi. **S3 Glacier Deep Archive -** "11 9's" of Durability with retrieval times of 12+ hours

b. **Requests and Data Retrievals:** You pay for requests made against your S3 buckets and objects. You also pay for retrieving objects that are stored in S3 Standard – Infrequent Access, S3 One Zone – Infrequent Access, S3 Glacier, and S3 Glacier Deep Archive.

c. **Data Transfer:** You pay for all bandwidth into and out of Amazon S3, except for the following:
   i. Data transferred in from the internet.
   ii. Data transferred between S3 buckets in the same AWS Region.
   iii. Data transferred from an Amazon S3 bucket to any AWS service(s) within the same AWS Region as the S3 bucket (including to a different account in the same AWS Region).
   iv. Data transferred out to Amazon CloudFront.

2. **EC2 Pricing –**

a. **On-Demand –** On-Demand Instances let you pay for compute capacity by the hour or second (minimum of 60 seconds) with no long-term commitments. This frees you from the costs and complexities of planning, purchasing, and maintaining hardware and transforms what are commonly large fixed costs into much smaller variable costs. (most expensive)

b. **Reserved –** Amazon EC2 Reserved Instances (RI) provide a significant discount (up to 72%) compared to On-Demand pricing and provide a capacity reservation when used in a specific Availability Zone. (cheaper)
   i. AWS Billing automatically applies your RI's discounted rate when attributes of EC2 instance usage match attributes of an active RI.
   ii. If an Availability Zone is specified, EC2 reserves capacity matching the attributes of the RI. The capacity reservation of an RI is automatically utilized by running instances matching these attributes.
   iii. You can also choose to forego the capacity reservation and purchase an RI that is scoped to a region. RIs that are scoped to a region automatically apply the RI's discount to instance usage across AZs and instance sizes in a region, making it easier for you to take advantage of the RI's discounted rate.

c. **Spot -** Amazon EC2 Spot Instances let you take advantage of unused EC2 capacity in the AWS cloud. Spot Instances are available at up to a 90% discount compared to On-Demand prices. You can use Spot Instances for various stateless, fault-tolerant, or flexible applications such as big data, containerized workloads, CI/CD, web servers, high-performance computing (HPC), and test & development workloads. Because Spot Instances are tightly integrated with AWS services such as Auto Scaling, EMR, ECS, CloudFormation, Data Pipeline and AWS Batch, you can choose how to launch and maintain your applications running on Spot Instances. (can be the least expensive option)

d. **Dedicated Host -** Physical servers with Amazon EC2 instance capacity that is fully dedicated to your use. You can use your existing per-socket, per-core, or per-VM software licenses to help maintain license compliance. You can purchase On-Demand Dedicated Hosts and Dedicated Hosts Reservations. Of all the Amazon EC2 options, Dedicated Hosts are the most expensive.

3. **Lambda Pricing** – With AWS Lambda, you pay only for what you use. You are charged based on the number of requests for your functions and the duration, the time it takes for your code to execute.

4. **AWS Free Tier -** Enables you to begin using certain services without having to worry about incurring costs for the specified period.
    a. Three types of offers are available:
        i. **Always Free:** These offers do not expire and are available to all AWS customers. For example, AWS Lambda allows 1 million free requests and up to 3.2 million seconds of compute time per month. Amazon DynamoDB allows 25 GB of free storage per month.
        ii. **12 Months Free:** Examples include specific amounts of Amazon S3 Standard Storage, thresholds for monthly hours of Amazon EC2 compute time, and amounts of Amazon CloudFront data transfer out.
        iii. **Trials:** For example, Amazon Inspector offers a 90-day free trial. Amazon Lightsail (a service that enables you to run virtual private servers) offers 750 free hours of usage over a 30-day period.

Recognize the various account structures in relation to AWS billing and pricing

1. **Consolidated Billing** – The consolidated billing feature of AWS Organizations enables you to receive a single bill for all AWS accounts in your organization. By consolidating, you can easily track the combined costs of all the linked accounts in your organization. The default maximum number of accounts allowed for an organization is 4, but you can contact AWS Support to increase your quota, if needed.
2. **AWS Organizations** - AWS Organizations helps you centrally govern your environment as you grow and scale your workloads on AWS. Whether you are a growing startup or a large enterprise, Organizations helps you to centrally manage billing; control access, compliance, and security; and share resources across your AWS accounts.

Identify resources available for billing support

1. **Cost Explorer -** AWS Cost Explorer has an easy-to-use interface that lets you visualize, understand, and manage your AWS costs and usage over time. Get started quickly by creating custom reports that analyze cost and usage data. Analyze your data at a high level (for example, total costs and usage across all accounts) or dive deeper into your cost and usage data to identify trends, pinpoint cost drivers, and detect anomalies.
2. **TCO Calculator -** AWS helps you reduce Total Cost of Ownership (TCO) by reducing the need to invest in large capital expenditures and providing a pay-as-you-go model that empowers you to invest in the capacity you need and use it only when the business requires it. Our TCO calculators allow you to estimate the cost savings when using AWS and provide a detailed set of reports that can be used in executive presentations. The calculators also give you the option to modify assumptions that best meet your business needs.
3. **AWS Pricing Calculator** - Lets you explore AWS services and create an estimate for the cost of your use cases on AWS. You can organize your AWS estimates by groups that you define. A group can reflect how your company is organized, such as providing estimates by cost center.
4. **AWS Budgets** - Allows you to set custom budgets that alert you when your costs or usage exceed the budgeted amount.
5. **AWS Cost and Usage Reports: C**ontains the most comprehensive set of cost and usage data available. Can be used to publish AWS billing reports to an Amazon S3 bucket that you own. You can receive reports that break down your costs by the hour, day, or month, by product or product resource, or by tags that you define yourself.
6. **Tags** - AWS allows customers to assign metadata to their AWS resources in the form of tags. Each tag is a simple label consisting of a customer-defined key and an optional value that can make it easier to manage, search for, and filter resources by purpose, owner, environment, or other criteria. AWS Cost Explorer and detailed billing reports let you break down AWS costs by tag. Typically, you use business tags such as *cost center/business unit*, *customer*, or *project* to associate AWS costs with traditional cost-allocation dimensions. But a cost allocation report can include any tag. This lets you associate costs with technical or security dimensions, such as specific applications, environments, or compliance programs.

Appendix

Which key tools, technologies, and concepts might be covered on the exam?
The following is a non-exhaustive list of the tools and technologies that could appear on the exam. This list is subject to change and is provided to help you understand the general scope of services, features, or technologies on the exam. The general tools and technologies in this list appear in no particular order. AWS services are grouped according to their primary functions.

The following list is inclusive of terms that may appear on the exam, in scenarios presented to you on the exam, or as potential answers to questions. Understanding the definition and general use case of the following services should be your focus

While some of these technologies will likely be covered more than others on the exam, the order and placement of them in this list are no indication of relative weight or importance:

- APIs
- Cost Explorer
- AWS Cost and Usage Report
- AWS Command Line Interface (CLI)
- Elastic Load Balancers
- Amazon EC2 instance types (for example, Reserved, On-Demand, Spot)
- AWS global infrastructure (for example, AWS Regions, Availability Zones)
- Infrastructure as Code (IaC)
- Amazon Machine Images (AMIs)
- AWS Management Console
- AWS Marketplace
- AWS Professional Services
- AWS Personal Health Dashboard
- Security groups
- AWS Service Catalog
- AWS Service Health Dashboard
- Service quotas
- AWS software development kits (SDKs)
- AWS Support Center
- AWS Support tiers
- Virtual private networks (VPNs)
- AWS Well-Architected Framework

AWS services and features

Analytics:

- Amazon Athena
- Amazon Kinesis
- Amazon QuickSight

Application Integration:
- Amazon Simple Notification Service (Amazon SNS)
- Amazon Simple Queue Service (Amazon SQS)

Compute and Serverless:
- AWS Batch
- Amazon EC2
- AWS Elastic Beanstalk Version
- AWS Lambda
- Amazon Lightsail
- Amazon WorkSpaces

Containers:
- Amazon Elastic Container Service (Amazon ECS)
- Amazon Elastic Kubernetes Service (Amazon EKS)
- AWS Fargate

Database:
- Amazon Aurora
- Amazon DynamoDB
- Amazon ElastiCache
- Amazon RDS
- Amazon Redshift

Developer Tools:
- AWS CodeBuild
- AWS CodeCommit
- AWS CodeDeploy
- AWS CodePipeline
- AWS CodeStar

Customer Engagement:
- Amazon Connect

Management, Monitoring, and Governance:
- AWS Auto Scaling
- AWS Budgets

- AWS CloudFormation
- AWS CloudTrail
- Amazon CloudWatch
- AWS Config
- AWS Cost and Usage Report
- Amazon EventBridge (Amazon CloudWatch Events)
- AWS License Manager
- AWS Managed Services
- AWS Organizations
- AWS Secrets Manager
- AWS Systems Manager
- AWS Systems Manager Parameter Store
- AWS Trusted Advisor

Networking and Content Delivery:
- Amazon API Gateway
- Amazon CloudFront
- AWS Direct Connect
- Amazon Route 53
- Amazon VPC

Security, Identity, and Compliance:
- AWS Artifact
- AWS Certificate Manager (ACM)
- AWS CloudHSM
- Amazon Cognito
- Amazon Detective
- Amazon GuardDuty
- AWS Identity and Access Management (IAM)
- Amazon Inspector
- AWS License Manager
- Amazon Macie
- AWS Shield
- AWS WAF

Storage:
- AWS Backup
- Amazon Elastic Block Store (Amazon EBS)
- Amazon Elastic File System (Amazon EFS)

- Amazon S3
- Amazon S3 Glacier
- AWS Snowball Edge
- AWS Storage Gateway

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